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Practitioner's Docket No. 297-007778-US(PAR)

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Box Patent Application  
Assistant Commissioner for Patents  
Washington, D.C. 20231

**NEW APPLICATION TRANSMITTAL**

Transmitted herewith for filing is the patent application of  
Inventor(s): Kimmo LAAKKONEN

**WARNING:** Patent must be applied for in the name(s) of all of the actual inventor(s). 37 CFR 1.41(a) and 1.53(b).  
For (title): LANGUAGE-DEPENDENT LETTER INPUT BY MEANS OF NUMBER KEYS

**CERTIFICATION UNDER 37 C.F.R. 1.10\***  
(Express Mail label number is **mandatory**.)  
(Express Mail certification is optional.)

I hereby certify that this New Application Transmittal and the documents referred to as attached therein are being deposited with the United States Postal Service on this date February 2, 1998, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EM174705521US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Jaime McElhill

(type or print name of person mailing paper)

Jaime McElhill

Signature of person mailing paper

**WARNING:** Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

**\*WARNING:** Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

(Application Transmittal [4-1]—page 1 of 9)

1. Type of Application

This new application is for a(n)

(check one applicable item below)

- ☒ Original (nonprovisional)  
☐ Design  
☐ Plant

**WARNING:** Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.

**WARNING:** Do not use this transmittal for the filing of a provisional application.

**NOTE:** If one of the following 3 items apply, then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.

- ☐ Divisional.  
☐ Continuation.  
☐ Continuation-in-part (C-I-P).

2. Benefit of Prior U.S. Application(s) (35 U.S.C. 119(e), 120, or 121)

**NOTE:** If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

**WARNING:** If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(c). (35 U.S.C. 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b).) For a c-i-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.

**WARNING:** When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application must be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3).

- ☐ The new application being transmitted claims the benefit of prior U.S. application(s). Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

3. Papers Enclosed That Are Required for Filing Date under 37 C.F.R. 1.53(b)  
(Regular) or 37 C.F.R. 1.153 (Design) Application

- 6   Pages of specification  
  2   Pages of claims  
  1   Pages of Abstract  
  2   Sheets of drawing  
☐ formal  
☐ informal

**WARNING:** DO NOT submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. Comments on proposed new 37 CFR 1.84. Notice of March 9, 1988 (1990 O.G. 57-62).

**NOTE:** "Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page." 37 C.F.R. 1.84(c).

(complete the following, if applicable)

- ☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 C.F.R. 1.84(b).

**4. Additional papers enclosed**

- ☐ Preliminary Amendment  
☒ Information Disclosure Statement (37 C.F.R. 1.98)  
☒ Form PTO-1449 (PTO/SB/08A and 08B)  
☒ Citations  
☐ Declaration of Biological Deposit  
☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.  
☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative  
☐ Special Comments  
☐ Other

**5. Declaration or oath**

- ☒ Enclosed  
Executed by

(check all applicable boxes)

- ☒ inventor(s).  
☐ legal representative of inventor(s).  
37 CFR 1.42 or 1.43.  
☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.  
☐ This is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. See item 13 below for fee.  
☐ Not Enclosed.

**WARNING:** Where the filing is a completion in the U.S. of an International Application, but where a declaration is not available, or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.

- ☐ Application is made by a person authorized under 37 C.F.R. 1.41(c) on behalf of all the above named inventor(s).

*(The declaration or oath, along with the surcharge required by 37 CFR 1.16(e) can be filed subsequently).*

*NOTE: It is important that all the correct inventor(s) are named for filing under 37 CFR 1.41(c) and 1.53(b).*

- ☐ Showing that the filing is authorized.  
*(not required unless called into question. 37 CFR 1.41(d))*

## 6. Inventorship Statement

**WARNING:** *If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.*

The inventorship for all the claims in this application are:

- ☐ The same.

or

- ☐ Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,  
☐ is submitted.  
☐ will be submitted.

## 7. Language

*NOTE: An application including a signed oath or declaration may be filed in a language other than English. A verified English translation of the non-English language application and the processing fee of \$130.00 required by 37 CFR 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 CFR 1.52(d).*

*NOTE: A non-English oath or declaration in the form provided or approved by the PTO need not be translated. 37 CFR 1.69(b).*

- ☒ English  
☐ Non-English  
☐ The attached translation is a verified translation. 37 C.F.R. 1.52(d).

## 8. Assignment

- ☒ An assignment of the invention to Nokia Mobile Phones Ltd

- ☒ is attached. A separate ☒ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

- ☐ will follow.

*NOTE: "If an assignment is submitted with a new application, send two separate letters—one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).*

**WARNING:** *A newly executed "CERTIFICATE UNDER 37 CFR 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.*

# 9. Certified Copy

Certified copy(ies) of application(s)

Country	Appln. No.	Filed
Finland	970468	4 February 1997
Country	Appln. No.	Filed
Country	Appln. No.	Filed

from which priority is claimed

☒ is (are) attached.

☐ will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 CFR 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

# 10. Fee Calculation (37 C.F.R. 1.16)

A. ☒ Regular application

CLAIMS AS FILED			
Number filed	Number Extra	Rate	Basic Fee 37 C.F.R. 1.16(a) \$790.00
Total			
Claims (37 CFR 1.16(c)) 10 - 20 = 0	×	\$ 22.00	
Independent			
Claims (37 CFR 1.16(b)) 2 - 3 = 0	×	\$ 82.00	
Multiple dependent claim(s), if any (37 CFR 1.16(d))	+	\$270.00	

☐ Amendment cancelling extra claims is enclosed.

☐ Amendment deleting multiple-dependencies is enclosed.

☐ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 CFR 1.16(d).

Filing Fee Calculation

\$ 790.00

- B. ☐ Design application  
(\$330.00—37 CFR 1.16(f))

Filing Fee Calculation

\$ \_\_\_\_\_

- C. ☐ Plant application  
(\$540.00—37 CFR 1.16(g))

Filing fee calculation

\$ \_\_\_\_\_

**11. Small Entity Statement(s)**

- ☐ Verified Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is (are) attached.

**WARNING:** "Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. A nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121 or 365(c) of a prior application may rely on a verified statement filed in the prior application if the nonprovisional application includes a reference to a verified statement in the prior application or includes a copy of the verified statement filed in the prior application if status as a small entity is still proper and desired." 37 C.F.R. § 1.28(a).

(complete the following, if applicable)

- ☐ Status as a small entity was claimed in prior application  
\_\_\_\_\_ / \_\_\_\_\_, filed on \_\_\_\_\_, from which benefit  
is being claimed for this application under:

35 U.S.C. ☐ 119(e),  
☐ 120,  
☐ 121,  
☐ 365(c),

and which status as a small entity is still proper and desired.

- ☐ A copy of the verified statement in the prior application is included.

Filing Fee Calculation (50% of A, B or C above)

\$ \_\_\_\_\_

**NOTE:** Any excess of the full fee paid will be refunded if a verified statement and a refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under § 1.136. 37 CFR 1.28(a).

**12. Request for International-Type Search (37 C.F.R. 1.104(d))**

(complete, if applicable)

- ☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made at This Time

- ☐ Not Enclosed
- ☐ No filing fee is to be paid at this time.  
(This and the surcharge required by 37 C.F.R. 1.16(e) can be paid subsequently.)

☒ Enclosed

- ☒ Filing fee \$ 790.00
- ☒ Recording assignment  
(\$40.00; 37 C.F.R. 1.21(h))  
(See attached "COVER SHEET FOR  
ASSIGNMENT ACCOMPANYING NEW  
APPLICATION".) \$ 40.00
- ☐ Petition fee for filing by other than all the  
inventors or person on behalf of the inventor  
where inventor refused to sign or cannot be  
reached  
(\$130.00; 37 C.F.R. 1.47 and 1.17(h)) \$
- ☐ For processing an application with a  
specification in  
a non-English language  
(\$130.00; 37 C.F.R. 1.52(d) and 1.17(k)) \$
- ☐ Processing and retention fee  
(\$130.00; 37 C.F.R. 1.53(d) and 1.21(l)) \$
- ☐ Fee for international-type search report  
(\$40.00; 37 C.F.R. 1.21(e)) \$

NOTE: 37 CFR 1.21(l) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 CFR 1.53(d) and this, as well as the changes to 37 CFR 1.53 and 1.78, indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the processing and retention fee of § 1.21(l) must be paid, within 1 year from notification under § 53(d).

Total fees enclosed \$ 830.00

14. Method of Payment of Fees

- ☒ Check in the amount of \$ 830.00
- ☐ Charge Account No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_

A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 CFR 1.22(b).

15. Authorization to Charge Additional Fees

**WARNING:** If no fees are to be paid on filing, the following items should not be completed.

**WARNING:** Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 16-1350:

☒ 37 C.F.R. 1.16(a), (f) or (g) (filing fees)

☒ 37 C.F.R. 1.16(b), (c) and (d) (presentation of extra claims)

**NOTE:** Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

☒ 37 C.F.R. 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

☒ 37 C.F.R. 1.17 (application processing fees)

**WARNING:** While 37 CFR 1.17(a), (b), (c) and (d) deal with extensions of time under § 1.136(a), this authorization should be made only with the knowledge that: "Submission of the appropriate extension fee under 37 C.F.R. 1.136(a) is to no avail unless a request or petition for extension is filed." (Emphasis added). Notice of November 5, 1985 (1060 O.G. 27).

☐ 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

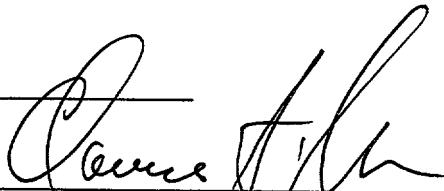
**NOTE:** Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b).

**NOTE:** 37 CFR 1.28(b) requires "Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . issue fee." From the wording of 37 CFR 1.28(b), (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

16. Instructions as to Overpayment

☒ Credit Account No. 16-1350

☐ Refund

  
SIGNATURE OF PRACTITIONER

Clarence A. Green

(type or print name of attorney)

PERMAN & GREEN, LLP

P.O. Address

425 Post Road, Fairfield, CT 06430

Reg. No. 24,622

Tel. No. (203) 259-1800

Customer No.



(check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)

- Number of pages added \_\_\_\_\_

- Number of pages added \_\_\_\_\_

- Number of pages added \_\_\_\_\_

(if no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item)

- (Application Transmittal [4-1]—page 9 of 9)

### Language-dependent letter input by means of number keys

The invention relates to the connection between characters input through a keypad  
5 to an electronic device and keystrokes. Particularly the invention relates to how  
several different characters can be input using one and the same key.

Portable phones, paging devices and other compact electronic apparatuses usually include a smallish keypad by means of which the user can issue push-button commands to the device. The most common keypad types have number keys from 0 to 9, special character keys \* and # as well as a small number of function keys such as the start call and hangup keys.

Many above-mentioned devices have additional features the use of which requires input of letters and other characters to the device. Such functions include the sending of text messages and the use of alphanumeric memo functions. Due to the small size of the devices it is usually not possible to provide them with letter keypads such as those used in portable computers, but letters and special characters are entered using the number keys. Many mobile phones have a so-called ABC key which, when pressed, allows the user to choose whether he wants to input numbers or letters. Additionally, due to the large number of letters, several letters are associated with one key so that a first push of a key produces one letter, a second push of the key in rapid succession replaces the letter with another one and so forth. As there are about 25 to 30 letters in the Latin alphabet, depending on the language, there are usually about three letters associated to one number key.

There is however the problem that different languages that use the Latin alphabet have different letters and not all the letters appear in all the languages. Scandinavian languages, for example, have letters ä, ö, å, æ and ø which are not used in many other Latin-alphabet languages. The French are often particular about the correct use of accent marks so that characters í, ì and î have to be considered letters proper. Additionally, Icelandic, for example, has quite a number of letters which are not used in any other language. Greek has an alphabet of its own and most of the Slavonic languages are written in Cyrillic letters. In the area of former Yugoslavia some ethnic groups use Cyrillic letters and others use the Latin alphabet.

If we want to associate all or almost all the necessary characters with the number pad keys, we will easily get a great number of characters per key. Let us use the 2-

key in the number keypad as an example: according to a widespread custom letters a, b and c are associated with that key. When a device equipped with such a keypad is used in the letter entering mode, a first push of the 2-key produces the letter a, the second push produces b, the third push produces c, and the fourth push produces the character 2. So we can say that the characters of the 2-key are "abc2". If we wish to associate with the 2-key all characters in the Latin-alphabet languages that are closely related to a, b and c, we would get something like "abc2àáâãäåæç" as the sequence of characters associated with the 2-key; that is 11 characters in all. If a Danish user wants to use the device in his own language, he has to press one and the same key 10 times to produce the character æ on the display. Totally unnecessary are the presses used to skip characters à, á, â and ã, because these characters are not used at all in the Danish language.

An object of this invention is to provide a method and apparatus whereby a keypad having a limited number of keys can be flexibly used for entering desired letters and special characters.

The objects of the invention are achieved by associating letters and other characters with keys according to the language chosen as the operating language of the device.

The method according to the invention is characterised in that it comprises steps wherein

- information is produced concerning which set of the possible characters entered as push-button commands is in use and

- each key is associated with a subset of characters of the selected character set

whereby, in response to n successive presses of a key, input is produced in the form of the character the ordinal number of which in the list of characters associated with that particular key corresponds to n.

The invention is also directed to an apparatus which is characterised in that it has a memory element connected to an electronic circuit interpreting push-button commands, said memory element comprising a part for storing information indicating which set of the possible characters entered as push-button commands is in use, and character set tables for selectively associating characters with keys according to the information in said part.

According to the invention the apparatus preferably associates with each key only characters that correspond to characters used in the language selected as the operating language for the apparatus. In an advantageous implementation keystrokes and the number of keystrokes have no physical connection with letters or characters, but the relations between the keystrokes and characters are made in an electronic circuit interpreting push-button commands. Changing of the characters associated with a key is carried out by a program which controls the operation of said circuit. The program receives as input a language selection by means of which the user or a programmer of the apparatus determines the language used. Since no physical changes are necessary, the number of languages as well as the number of characters associated with the languages are only limited by the size of the program memory in the apparatus. According to a proposal, all currently used letter, number and special characters will be represented by 16-bit Unicode bit sequences so that it will become possible to display over 65,000 different characters. If 130 kilobytes of the program memory in the apparatus can be reserved for the display of characters, all Unicode characters can be stored in memory and grouped into character sets so that the user can then select a character set to be used.

The invention is described in more detail with reference to the preferred embodiments presented by way of example and to the attached drawing where

Fig. 1 shows a keypad wherein various character sets can be assigned to the keys,

Fig. 2 shows in the form of a flow chart part of a program which realises the method according to the invention, and

Fig. 3 shows in schematic fashion an apparatus according to the invention.

Fig. 1 shows a number keypad 100 which in outward appearance accords with a known arrangement, ie. its keys form a matrix of four rows and three columns. The middle key 101 in the top row corresponds to number 2 but has also certain letter characters associated with it. According to the invention the selection of letters associated with key 101 depends on the language selected as the operating language for the apparatus whereof the keypad 100 constitutes a part. In Fig. 1 a table 102 is shown on the right where rows correspond to operating languages and columns to keys in the keypad 100. Only part of the table 102 is shown so as to keep the graphic clear. The connections between key 101 and cells in table 102 are represented by arrows. If, for example, the operating language is Finnish (FI), key 101 corresponds

to character sequence abc2åå in alphanumeric use, and if the operating language is Danish, key 101 corresponds to character sequence abc2åæ in the alphanumeric mode. On the basis of this pattern a person skilled in the art can easily construct the contents of the rest of the cells in table 102 and the connections between the keys and cells.

The mutual order of characters in the cells of table 102 refers to the order in which the characters are displayed (not shown) when the user presses the key in question in rapid succession. The alphabetical order shown in the figure serves illustrative purposes only, and a suitable mutual order of the characters associated with each key in alphanumeric use can be found by studying user preferences. It is also possible to have in the apparatus a memory element which keeps count of the characters entered through each key and dynamically arranges the characters associated with each key in such an order that the most often entered character of a certain key is displayed on one push of the key, the second most often entered character is displayed on two pushes of the key and so forth. Such an arrangement results in that the number of keystrokes required of the user is statistically as small as possible.

In addition to a language selection the rows in table 102 may also represent other situations affecting the selection of the character set. One option could be a row "ALL LETTERS" in table 102, corresponding to a situation in which the user wants that all possible letters are associated with the keys in accordance with a grouping rule. A grouping rule can be e.g. such that each key is associated with all the letters that can be considered to be related to the letters printed on the surface of the key. As letters abc are printed on key 101, letters abc2ååääåæαβρϕχ, for example, could be associated with the key by the "ALL LETTERS" row of table 102. Since it is quite a number of letters that are then associated with each key, a particularly useful feature in this option is the aforementioned memory element which automatically keeps count of keystrokes and arranges the characters associated with a key in the order according to the frequency of use. Table 102 may also contain rows connected with certain symbol or special character sets so that letters or characters associated with a certain key are independent of any language proper. From the user's point of view, however, it is simplest if the row selected from table 102 is determined on the basis of the active operating language so that the user needs not to think about which character set to use.

The simplest way of selecting an operating language is that the user interface comprises a language menu which includes all the operating language choices

available. Using the general control functions of the user interface the user gets the language menu on the display and activates the language that he wants use.

Fig. 2 shows a simple flow chart which illustrates letter input through a number keypad in accordance with the method according to the invention. In block 200 the operation branches according to the operating language selected. To keep the diagram clear and simple, Fig. 2 only shows the branches corresponding to the selection of Finnish and Danish. In block 201 or 202 the apparatus detects which key in the keypad was pressed. For simplicity's sake the figure shows only those parts of the flow chart which are related to the pressing of the "2 abc" key. A person skilled in the art can easily construct similar decision chains for the rest of the keys on the basis of the pattern disclosed here. The decision chain of a key contains the characters that are associated with that key. In the decision blocks 203a-f or 204a-f the apparatus examines whether the user pressed within a predetermined repeat interval the same key again. The length of the repeat interval can be chosen in the same way as in keypad solutions according to the prior art. Depending on the current language branch in the flow chart, repeated presses of the key produce different character inputs, depicted by blocks 205a-f and 206a-f. The characters and their mutual order are chosen in the same manner as above in table 102 of Fig. 1. The operation continues outside the flow chart of Fig. 2 when the user presses e.g. the start call key or another key that ends the character input.

Fig. 2 uses an arrow to represent return from the last decision block 203f or 204f to the first if the number of repeated presses of a key exceeds the number of characters associated with the key. Generally it can be said that pressing a key  $n$  times in (rapid enough) succession will produce a character input the ordinal number of which in the list of characters associated with the key is  $[(n-1) \bmod m] + 1$ , where  $m$  is the number of characters associated with the key. An embodiment can also be disclosed that has no return to the first decision block, but in order to produce a single character input each key can be pressed successively only as many times as there are characters associated with the key. Then, pressing a key  $n$  times in (rapid enough) succession will produce a character input consisting of  $(n-1) \div m$  times the last character in the list of characters associated with the key as well as the character the ordinal number of which in the list is  $[(n-1) \bmod m] + 1$ . According to this alternative, pressing the "2 abc" key seven times in succession in an arrangement otherwise according to Fig. 2 would produce a character input consisting of characters å and a when the operating language is Finnish (the first six presses would produce the character å and the next single press would produce the character a).

In a further embodiment of the invention, one has to press only once the key with which the characters according to the language selection are associated. In response to the press of the key the apparatus displays all characters associated with the key.

- 5 The user can then use arrow keys to move the cursor (which is known from the prior art) on the display to the desired character and accept it by pressing, for example, an OK key.

- 10 The apparatus according to the invention comprises, in accordance with Fig. 3, a keypad 300, an electronic circuit 301 interpreting push-button commands entered at the keypad, and a memory element 302 which contains information in block 302a concerning the character set chosen (e.g. the language selected) as well as several character set tables 302b-302n which store information about which characters are associated with the individual keys, depending on the contents of block 302a.
- 15 Additionally, the memory block 302 includes program instructions according to which the circuit 301 functions. The connection between the circuit 301 and memory element 302 is preferably a two-way connection so that information stored in the memory element 302 can be altered e.g. with a push-button command corresponding to the choosing of a new operating language. Generally it is also
- 20 possible to alter the information in the memory element in ways other than using push-button commands, e.g. through a special programming interface (not shown in the drawing). The reference designator 303 represents other parts of the apparatus the operation of which is controlled by the push-button commands.

- 25 The embodiments discussed are presented by way of example only, and it is obvious to a person skilled in the art that the inventive idea disclosed here can be modified within the scope of the invention defined by the claims set forth below.

### Claims

1. A method for producing character input in an apparatus having a keypad (100, 300), **characterised** in that it comprises stages wherein
  - information is produced (200) concerning which set of the possible characters
- 5 entered as push-button commands is in use and
  - each key in the keypad is associated with a certain subset of characters belonging to the selected set of characters.
2. The method of claim 1, **characterised** in that in response to n successive
   
10 presses of a key (203a-203f, 204a-204f) a character input is produced (205a-205f, 206a-206f) the ordinal number of which in the list of characters associated with the key in question corresponds to n.
3. The method of claim 2, **characterised** in that a character input is produced the
   
15 ordinal number of which in the list of characters associated with the key in question is  $[(n-1) \bmod m] + 1$ , where m is the number of characters associated with the key in question.
4. The method of claim 2, **characterised** in that a character input is produced
   
20 which consists of  $(n-1) \div m$  instances of the last character in the list of characters associated with the key in question and, in addition, the character the ordinal number of which in the list of characters associated with the key in question is  $[(n-1) \bmod m] + 1$ .
- 25 5. The method of claim 1, **characterised** in that said information indicating which set of the possible characters entered as push-button commands is in use, is the same as information about the operating language of the apparatus, whereby the characters that belong to the alphabet of the operating language of the apparatus are used.
- 30 6. The method of claim 5, **characterised** in that it comprises stages for selecting an operating language, where
  - the available languages are presented to the user in the form of a menu, and
  - in response to an activation command issued by the user the language to which the
- 35 activation command is directed is set as the operating language.

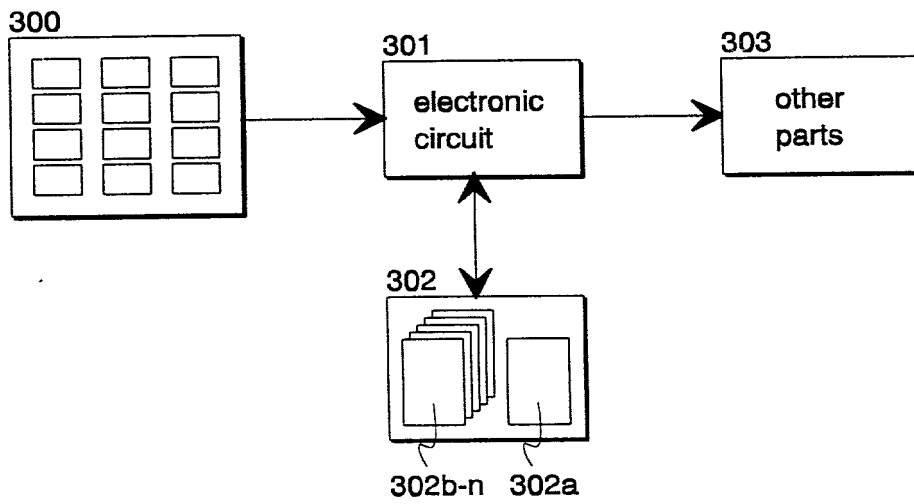
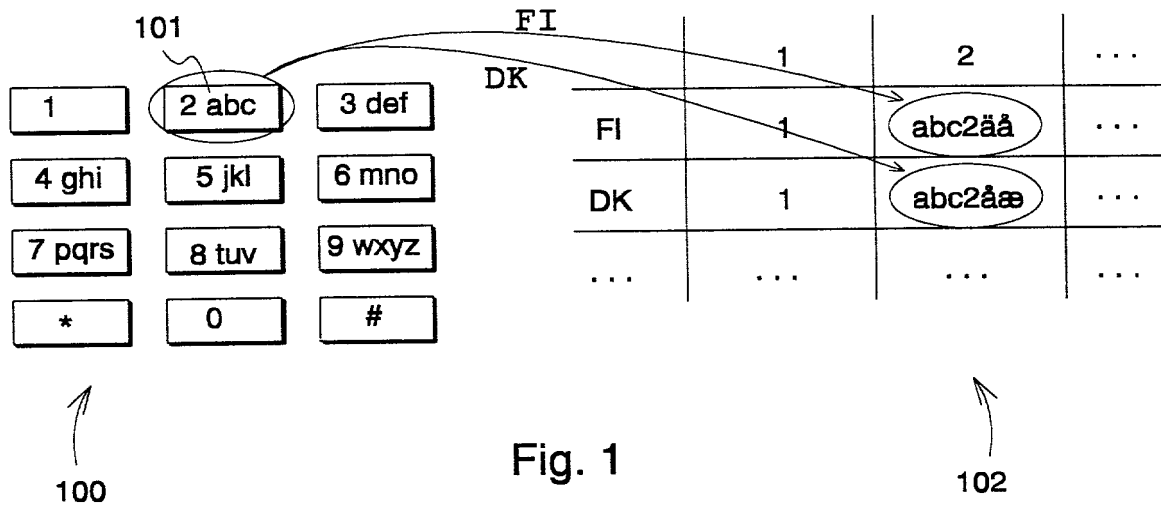


7. The method of claim 1, **characterised** in that the subsets of characters of the selected character set that are associated with the individual keys are arranged into lists in which the characters are in alphabetical order.
- 5 8. The method of claim 1, **characterised** in that the subsets of characters of the selected character set that are associated with the individual keys are arranged into lists in which the characters are in the order determined by the statistical frequency of use, the most frequently used character first.
- 10 9. The method of claim 1, **characterised** in that in response to a press of a key the characters associated with that key and the cursor are displayed, in response to presses of arrow keys indicating the direction of movement of the cursor said cursor is moved on the display, and in response to a press of an acceptance key a character input is produced consisting of the character at which the cursor is located on the
- 15 display at the moment when the acceptance key is pressed.
10. An apparatus equipped with a keypad (300) and including an electronic circuit (301) for converting presses of keys into character inputs, **characterised** in that it comprises in connection with the electronic circuit a memory element (302) which
- 20 includes a certain part (302a) for storing information indicating which set of the possible characters entered as push-button commands is in use as well as character set tables (302b-n) for selectively associating certain characters with each key on the basis of the information in said part (302a).

(57) Abstract

In an apparatus with a limited keypad (100, 300) several characters can be associated with each key. Characters associated with a key are determined on the basis of the language selected (200) as the operating language of the apparatus. The apparatus comprises a memory element (302) which includes a certain part (302a) for storing information indicating which set of the possible characters entered as push-button commands is in use as well as character set tables (302b-n) for selectively associating certain characters with each key on the basis of the information in said part (302a).

Fig. 1



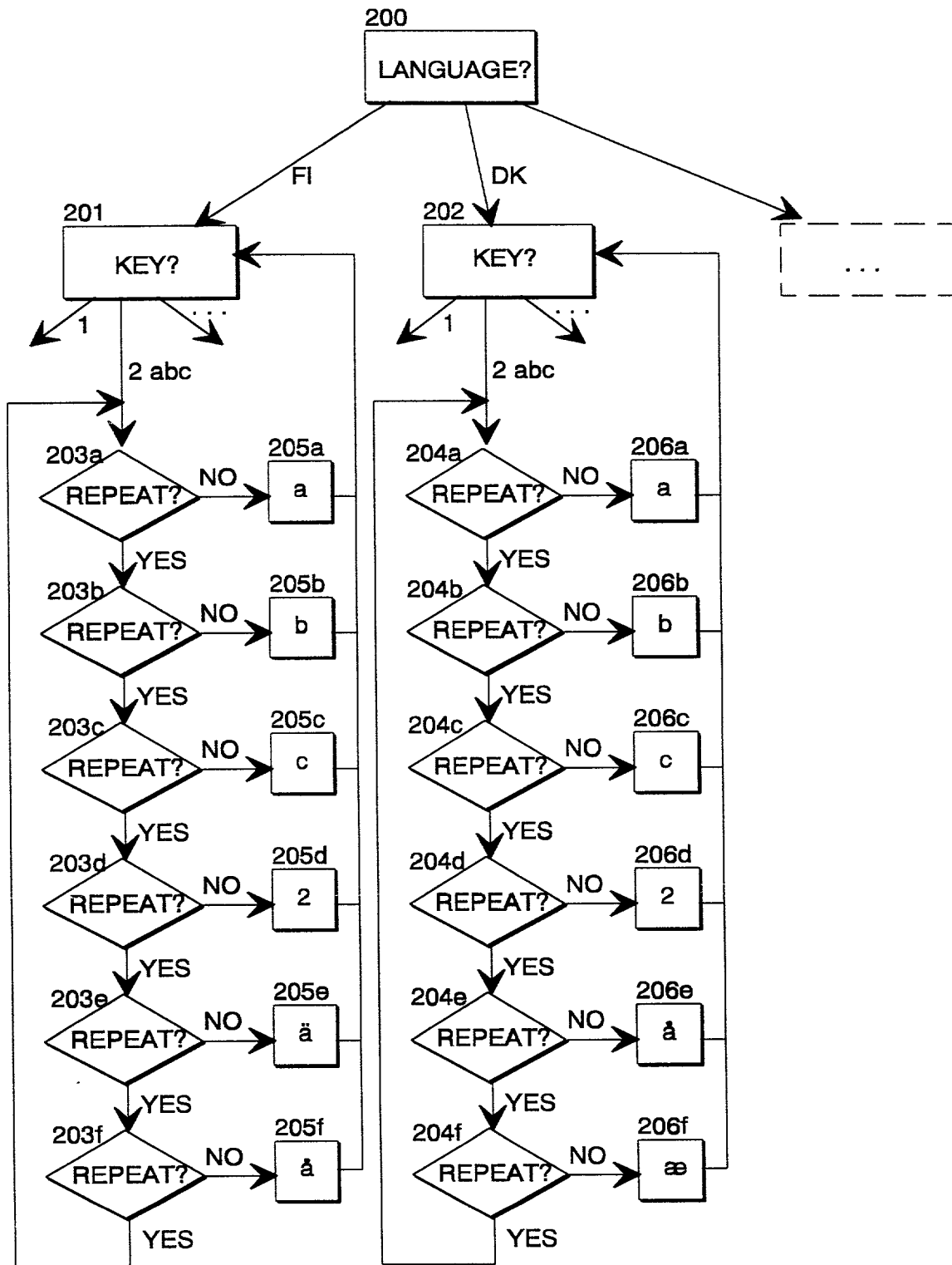


Fig. 2

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**COMBINED DECLARATION AND POWER OF ATTORNEY  
(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL,  
CONTINUATION OR C-I-P)**

---

As a below named inventor, I hereby declare that:

**TYPE OF DECLARATION**

This declaration is of the following type:

*(check one applicable item below)*

- ☒ original.
- ☐ design.
- ☐ supplemental.

*NOTE.* If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.

- ☐ national stage of PCT.

*NOTE:* If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR C-I-P.

- ☐ divisional.
- ☐ continuation.
- ☐ continuation-in-part (C-I-P).

**INVENTORSHIP IDENTIFICATION**

*WARNING:* If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.

My residence, post office address and citizenship are as stated below, next to my name. I believe that I am the original, first and sole inventor (*if only one name is listed below*) or an original, first and joint inventor (*if plural names are listed below*) of the subject matter that is claimed, and for which a patent is sought on the invention entitled:

**TITLE OF INVENTION**

**Language-dependent letter input by means of number keys**

## SPECIFICATION IDENTIFICATION

the specification of which:

*(complete (a), (b) or (c))*

(a) ☒ is attached hereto.

(b) \_\_\_ was filed on \_\_\_\_\_, as \_\_\_ Serial No. 0 / \_\_\_\_\_  
or \_\_\_ Express Mail No., as Serial No. not yet known \_\_\_\_\_  
and was amended on \_\_\_\_\_ *(if applicable)*.

*NOTE.* Amendments filed after the original papers are deposited with the PTO that contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 CFR 1.67.

(c) \_\_\_ was described and claimed in PCT International Application No. \_\_\_\_\_,  
filed on \_\_\_\_\_ and as amended under PCT Article 19 on  
\_\_\_\_\_ *(if any)*.

## ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56,

*(also check the following items, if desired)*

\_\_\_ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and

\_\_\_ in compliance with this duty, there is attached an information disclosure statement, in accordance with 37 CFR 1.98.

## PRIORITY CLAIM (35 U.S.C. § 119(a)-(d))

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

*(complete (d) or (e))*

(d) \_\_\_ no such applications have been filed.

(e) ☒ such applications have been filed as follows.

*NOTE.* Where item (c) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

**PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS  
(6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION  
AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119(a)-(d)**

COUNTRY(OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 37 USC 119
FINLAND	970468	4 February 1997	<input checked="" type="checkbox"/> YES      NO <input type="checkbox"/>
			<input type="checkbox"/> YES      NO <input type="checkbox"/>
			<input type="checkbox"/> YES      NO <input type="checkbox"/>
			<input type="checkbox"/> YES      NO <input type="checkbox"/>
			<input type="checkbox"/> YES      NO <input type="checkbox"/>

**CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)  
(34 U.S.C. § 119(e))**

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER

FILING DATE

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**CLAIM FOR BENEFIT OF EARLIER US/PCT APPLICATION(S)  
UNDER 35 U.S.C. 120**

\_\_\_ The claim for the benefit of any such applications are set forth in the attached  
ADDED PAGES TO COMBINED DECLARATION AND POWER OF  
ATTORNEY FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN-  
PART (C-I-P) APPLICATION.

Table 1. Demographic characteristics of the study population	
Age (years)	Mean (SD)
Male	55.2 (10.5)
Female	56.8 (11.2)
Marital status	
Married	78.5%
Single	12.3%
Divorced	8.2%
Widowed	1.0%
Education level	
High school or less	65.4%
College	34.6%
Income (USD/month)	
< 1000	25.3%
1000-2000	45.7%
> 2000	28.9%
Health insurance	
Private	60.1%
Public	39.9%
Comorbidities	
Hypertension	42.1%
Diabetes	18.5%
Cholesterol	35.2%
Smoking status	
Current smoker	15.8%
Former smoker	22.4%
Non-smoker	61.8%
Alcohol consumption	
Regular	8.9%
Occasional	21.3%
Never	69.8%

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(list name and registration number)

(check the following item, if applicable)

Clarence A. Green  
203-259-1800

(Declaration and Power of Attorney [1-1]-page 4 of 6)



## SIGNATURE(S)

*NOTE:* Carefully indicate the family (or last) name, as it should appear on the filing receipt and all other documents.

### Full name of sole or first inventor:

Kimmo  Laakkonen  
(GIVEN NAME) (MIDDLE INITIAL OR NAME) FAMILY (OR LAST NAME)  
Inventor's signature *Kimmo Laakkonen*  
Date 25.01.1998 Country of Citizenship Finland  
Residence Vanutehtaankatu 3 B 9, FIN-24260 SALO, Finland  
Post Office Address Vanutehtaankatu 3 B 9, FIN-24260 SALO, Finland  
Vanutehtaankatu

### Full name of second joint inventor, if any:

(GIVEN NAME) (MIDDLE INITIAL OR NAME) FAMILY (OR LAST NAME)  
Inventor's signature   
Date  Country of Citizenship   
Residence   
Post Office Address

### Full name of third joint inventor, if any:

(GIVEN NAME) (MIDDLE INITIAL OR NAME) FAMILY (OR LAST NAME)  
Inventor's signature   
Date  Country of Citizenship   
Residence   
Post Office Address

### Full name of fourth joint inventor, if any:

(GIVEN NAME) (MIDDLE INITIAL OR NAME) FAMILY (OR LAST NAME)  
Inventor's signature   
Date  Country of Citizenship   
Residence   
Post Office Address

(check proper box(es) for any of the following added page(s)  
that form a part of this declaration)

\_\_\_ **Signature** for fifth and subsequent joint inventors. *Number of pages added* \_\_\_\_.

\* \* \*

\_\_\_ **Signature** by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. *Number of pages added* \_\_\_\_.

\* \* \*

\_\_\_ **Signature** for inventor who refuses to sign or cannot be reached by person authorized under 37 CFR 1.47. *Number of pages added* \_\_\_\_.

\* \* \*

\_\_\_ Added page for **signature** by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time. (37 CFR 1.47)

\* \* \*

\_\_\_ Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.

\_\_\_ Number of pages added \_\_\_\_

\* \* \*

\_\_\_ Authorization of attorney(s) to accept and follow instructions from representative.

\* \* \*

(if no further pages form a part of this Declaration,  
then end this Declaration with this page and check the following item)

  x   This declaration ends with this page.